

BROMLEY MOUNTAIN BASE LODGE FUEL OIL TANK INVESTIGATION

September 1997

Prepared For:

BROMLEY MOUNTAIN SKI AREA
Route 11
Peru, VT

DSM ENVIRONMENTAL SERVICES, INC.
Engineers, Economists, Environmental Scientists, Planners

Thrasher Rd & Route 5, PO Box 466, Ascutney, VT 05030
TEL: (802) 674-2840 • FAX: (802) 674-6915
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DSM ENVIRONMENTAL SERVICES, INC.

Engineers, Economists, Environmental Scientists, Planners.

October 29, 1997

Mr. Bruce Linton
State of Vermont
Agency of Natural Resources
Waste Management Division
Sites Management Section
103 South Main Street / West Building
Waterbury, Vermont 05671-0404

Re: **Bromley Mountain Site Investigation**
Peru, Vermont
DEC Site #95-1902
DSM Project Number 318

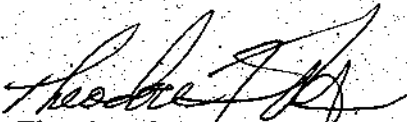
Dear Mr. Linton:

Enclosed, please find the final report for the site investigation program completed by DSM Environmental Services, Inc., on behalf of Bromley Mountain.

After your review of the enclosed report, should you have any questions or comments, please feel free to contact us.

Very truly yours

DSM Environmental Services, Inc.



Theodore S. Reeves, P.E.
Senior Project Manager

tsr

cc: Rolf van Schaik - Bromley Mountain

Thrasher Rd & Route 5, PO Box 466, Ascutney, VT 05030

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**BROMLEY MOUNTAIN BASE LODGE
FUEL OIL TANK INVESTIGATION**

September 1997

BROMLEY MOUNTAIN SKI AREA

Route 11
Peru, VT

SMS Site Number: 951902

Latitude/Longitude: 43°12'30" N; 72°56'15" W

Contact: Rolf van Schaik
Bromley Mountain
P.O. Box 1130
Manchester Center, VT 05255-1130

Phone: (802) 824-5458
Fax: (802) 824-5179

Engineer: Theodore Reeves, P.E.
DSM Environmental Services, Inc.
PO Box 466
Ascutney, VT 05030
Phone: (802) 674-2840
Fax: (802) 674-6915

Appendices

- A List of Adjacent Landowners
- B Locus, Site, and Groundwater Maps
- C Boring Logs
- D Soils Information
- E Lab Results

Executive Summary

Bromley Mountain Base Lodge, at the base of Bromley Mountain Ski Area in Peru, Vermont, was in the process of closing two underground fuel oil storage tanks in the Fall of 1995. Screened soil samples collected during the tank closure from underneath the tanks were "head spaced" with a photoionization detector (PID). PID readings taken exceeded 200 parts per million (ppm). Bromley Mountain kept the Vermont Department of Environmental Conservation (DEC) apprised of the situation and began an investigation program with the DEC later that fall.

Bromley Mountain contracted with DSM Environmental Services Inc., (DSM) in June, 1997 to continue the site investigation to qualify and quantify any impacts to soil and groundwater at the site.

DSM reviewed the site and site conditions in June of 1997 and developed a work plan for a site investigation in July. The work plan was approved by the Vermont Department of Environmental Conservation in July and borings were completed and groundwater monitoring wells were installed on September 4 and 5, 1997. Three wells were installed, one upgradient and two downgradient. Soil conditions at the site were found to be very dense soils. One boring, MW-1, was continued to refusal at approximately 27' below grade.

The wells were evaluated and developed on September 11, 1997 and purged. At this time, MW-1 (upgradient) was found to have very little water in it. The wells were then sampled the following week on September 17th. Two samples were collected from each well and from a potable water tap in the Base Lodge and analyzed for Total Petroleum Hydrocarbons (TPHs) and volatile organic compounds (VOCs). The results of these analyses showed that no compounds were present in concentrations exceeding the detection limits of the analysis method.

Based on the work completed during the course of this site investigation and the results of the laboratory analysis, DSM Environmental Services, Inc., does not recommend any additional work at this site.

Site Information

The names, addresses and phone numbers of the site owner, site operator and adjacent property owners are shown below in Table 1.

TABLE 1
SITE INFORMATION - CONTACT LIST

CONTACT TYPE	NAME	ADDRESS	PHONE NUMBER
Site Owner	Bromley Mountain Equity Limited Partnership	P.O. Box 1130 Manchester Center, VT 05255-1130	(802) 824-5458
Site Operator	Rolf van Schaik Bromley Mountain	P.O. Box 1130 Manchester Center, VT 05255-1130	(802) 824-5458
List of Adjacent Landowners	See Appendix A		

Site History

Bromley Mountain Ski Area was first developed in 1936. Prior to the establishment of the ski area, the past use of the site was in farming. An old farmhouse is still located on the property and is used as office space.

The Bromley Mountain Base Lodge is located at the base of Bromley Mountain at an elevation of about approximately 1,950 feet. The Lodge has grown and undergone several expansion projects since the property was originally developed. During one such project, a concrete slab was poured to construct a dining room and deck addition. The slab location was over the top of two #2 fuel oil underground storage tanks.

In the Fall of 1995, Bromley decided to close, what at the time was believed to be, only one fuel oil tank. Employees at the ski shop, which is located at ground level beneath the base lodge and adjacent to the UST site, began to smell fuel oil in the ski shop. Bromley staff devised a system to vent odors from the UST area through the USTs vent pipe to alleviate any odors in the ski shop. The vent system was connected but did not work properly. In investigating the vent problems a second tank was suspected of being connected to the first via a common vent manifold. Bromley staff continued excavating and discovered the second tank lying to the north of the first.

During the tank closure soil samples were collected from the soil underneath the UST and head-spaced with a PID. At the time, PID readings exceeded 200 parts per million (ppm) for some of the samples. No laboratory analysis of soil or groundwater samples for VOCs or TPHs were performed at the time.

Hazardous Waste Storage and Disposal Practices

Hazardous wastes generated at the ski area are associated with snowmaking and equipment service and maintenance. Waste oil is stored in an indoor, aboveground 1000 gallon tank and is used as fuel for the waste oil furnace that heats the Equipment Maintenance Building. The Maintenance Building is located on the opposite (south) side of Route 11 from the Base Lodge Building. Other hazardous materials stored on-site include solvents housed in a parts washing unit in the equipment maintenance building. The waste solvent is collected on a regular schedule by a licensed hazardous waste disposal firm that recovers the solvents for recycling.

Fuel oil contaminated soils associated with an underground storage tank closure completed September 4, 1997, are located at the Storage Yard opposite Bromley Village on the south side of Route 11. These soils were polyencapsulated following VT ANR protocols.

Past Releases of Hazardous Materials

The only past releases of hazardous materials/waste reported by Bromley Mountain was a fuel oil spill. In 1995, a piping failure occurred in the old farmhouse located on the site and released an estimated 50 gallons of fuel oil in the Eddy Brook Watershed. The spill was cleaned up by Bromley Mountain personnel using sorbent materials. The Vermont Department of Environmental Conservation was contacted and Tim Blake came out to review the site and clean up operations. (Conversation with Rolf van Schaik, October 2, 1997.)

Maps

Three maps are included with this site investigation report and are attached as Appendix B. These maps are:

- 1) Locus Map
- 2) Site Map
- 3) Groundwater Map

Receptors

All potential receptors were identified in the vicinity of the USTs at the Bromley Base Lodge. Each potential receptor is described below.

Water Supply Wells

All water supply wells that are located within 1,000 feet of the UST's location in the Town of Peru are shown in Table 2. below. The closest wells to the UST site are those serving the Base Lodge and other facilities at the base of the Mountain area.

TABLE 2
WATER SUPPLY WELLS LOCATED WITHIN 1,000 FEET
OF THE BROMLEY UST SITE

Id#	Owner Name	Well Yield (gpm)	Well Depth (feet)	Date Completed	Static Level (feet)
12	Horace C. Jones	3.0	212	6/68	NA
42	Big Bromley (Bromley Water Company)	90	400	11/73	41
113	Henry Piekarski	2.0	200	11/82	NA
135	Bromley/JPW Associates	26	340	11/87	80
136	Bromley	54	595	11/84	NA

Source: Vermont Department of Environmental Conservation, Water Supply Division

Community Water Supplies

There are four water systems in the Town of Peru of which three are transient non-community water supplies and one, Bromley Water Company, is a Public Community Water Supply. The only one that is within 1,000 feet of the site is Bromley Water Company wells. Two wells associated with this system are located in the basement of the base lodge.

Surface Waters and Wetlands

There are three named streams in the vicinity of Bromley Lodge, the Mill Brook, Eddy Brook and Winhall Brook. All flow in a southeasterly direction to the Winhall River. An unnamed tributary to Mill Brook and the snowmaking ponds are the closest potential surface water receptors to the UST site at Bromley Lodge, located approximately 600 feet from the UST site.

There are no wetlands identified in the immediate area of the USTs.

Buildings with basements

The closest buildings with a basement are the Base Lodge and the old Farm House Buildings.

Sensitive Ecological Areas

No sensitive ecological areas have been identified in the area around the Base area of Bromley Mountain.

Utility Corridors

Several Bromley and public utilities are located on the site. These include a power line on the Route 11 right-of-way, and several utilities operated by Bromley including snowmaking, site power, potable water, and waste water.

Areas of Direct Contact Threat

No areas of direct contact threat are currently identified on the site.

Contaminant

The contaminant in question is #2 fuel oil, a combustible liquid (NA 1993).

Geology

The site is located at an elevation of approximately 1,950 feet (NVGD) at the lower toe of the slope of Bromley Mountain. The Base Lodge site is characterized as a small plateau area located in the mountain area. Exposed bedrock is evident on the slopes of the mountain above the site.

Copies of the boring logs are included as Appendix C to this report.

Soils

Soils in the area of the site investigation are mapped as Berkshire fine sandy loam by the US Department of Agriculture, Soil Conservation Services (SCS). These soils are typically very stoney, with slopes in the range of 8 to 15%. The complete SCS description including the Soil Survey Field Sheet, Field Soil Maps Unit name, and Soil Interpretation Record is attached to this report as Appendix D.

Monitoring Wells

A total of three groundwater monitoring wells were installed on September 4 and 5, 1997 at the Bromley Base Lodge. The purpose of the wells is to assist with the identification of groundwater elevations and provide access to groundwater for sample collection. Three monitoring well locations were chosen as described below.

1) Upgradient Well (MW-B1)

A monitoring well was installed to the northwest of the former UST site and to the north of two potable water wells at the Bromley Base Lodge. This well is the upgradient location and located topographically upgradient of the two potable water supply wells at the Bromley Base Lodge. This well is intended to provide background groundwater quality data for the investigation.

2) Downgradient Well (MW-B2)

A second monitoring well was installed at a location south of the base lodge along a line extending south of the building's western wall. The well was located approximately 20 feet south of the Base Lodge in the Lodge's parking area and access road. The location of this well provides a downgradient access point for groundwater sampling and serves as one corner of the triangulation to determine the elevation and gradient of groundwater flow in the Base Lodge area.

3) Downgradient Well (MW-B3)

A third monitoring well was installed east of MW-B2 along the south side of the parking area. The well was located approximately 30 feet south of the Base Lodge on a line extending from the Base Lodge's eastern wall. The well, which was constructed on the edge of the access road, provides a second downgradient monitoring point at the site. It also provides the third point for the triangulation which will define the groundwater gradient at the site.

Monitoring Well Installation

The monitoring wells developed for the site were installed using a truck mounted drill rig with hollow stem augers. Soil borings were advanced using the hollow stem augers to water bearing strata or refusal. During advancement of the borings, soil samples were collected on five foot intervals using a split spoon sampler driven with a 140 pound hammer.

The borings continued until saturated soils or refusal was reached. At boring locations of MW-2 and MW-3, saturated soils were reached at 25 feet and 20 feet respectively. At the site of MW-1, refusal (assumed to be bedrock) was encountered at approximately 27' and the drilling could not proceed. A monitoring well was constructed at that point.

Each monitoring well was constructed of schedule 40 PVC pipe with an inside diameter of two inches. Each well included a ten foot section of 0.20" factory slotted and threaded screen, which was installed so that the screen straddled the prevailing groundwater level. Silica sand was used to fill the annular space between the PVC section and the wall of the boring. Bentonite clay pellets were used to seal each well. The well construction included a plug placed at the bottom of each well and a removable screw threaded friction cap at the well top. A road box was then installed at the top of each well to identify the location as a monitoring well.

Monitoring Well Logs

A copy of the boring well logs are included as Appendix C to this report. Data on depth to groundwater and well depth are shown in Table 3 below.

**TABLE 3
MONITORING WELL DATA**

Monitoring Well	Location	Depth to Groundwater	Depth of Water in Well	Well Elevation ⁽¹⁾	Groundwater Elevation
MW-1	NW of Base Lodge	27' 6"	1.5"	1001.65	975.32
MW-2	SW of Base Lodge	17' 3"	7' 6"	984.63	967.38
MW-3	SE of base Lodge	13' 2"	6' 3"	981.76	968.07

⁽¹⁾ Groundwater elevations are based on an assumed datum.

Plume Definition

No plume of dissolved product was defined during the course of this investigation.

Free Product

No free product was encountered during the course of this investigation.

Contaminant Fate and Transport

No contaminants were identified during this investigation in concentrations exceeding the detection limits of the analytical technologies used.

Sampling

Sampling Procedure - Groundwater Samples

The wells were checked and developed on September 11, 1997. DSM used factory sealed disposable bailers and nylon twine to obtain samples from each well. Each well has a designated bailer secured in the well to eliminate the potential of cross contamination between wells.

Prior to sampling, each road box was evaluated for signs of damage, tampering or water infiltration. No indication of tampering or infiltration was observed. After the road box was opened the annual space around the top of the well was monitored for vapors. Each well was then evaluated for any sign of damage, tampering or water infiltration and none were observed. The inner friction plug was then removed and again the well interior was checked for signs of vapors and none were observed.

Water depths in the wells were then checked and recorded. Disposable balers were used to sample the wells on September 17, 1997. The weather on this day was clear and approximately 70 degrees. The depth to groundwater from the well casing top and the total depth of the well were measured for each well to determine the depth of groundwater in each well. Using this information, the volume of water required to purge each well a minimum of three volumes was calculated and the wells were purged. MW-1 could not be baled due to the presence of only 2" of water in the well. The balers were returned to each well and the well caps and road boxes secured after sampling.

Samples were collected from each well and the potable water tap to be analyzed for Total Petroleum Hydrocarbons and Volatile Organic Compounds. The balers were used to collect samples from the wells. The water sample was poured directly into laboratory cleaned bottles and immediately sealed. The sealed sample bottles were then sealed in individual "zip-lock" bags for each sample group and placed in a cooler with ice packs. Two samples for each parameter were taken from each well, one being a sample duplicate. MW-1 could not be sampled due to the low level of water in the well. The samples were then delivered via overnight courier under a chain of custody to Eastern Analytical, Inc., for analysis.

A tap water sample was collected from the Base Lodge. First, the tap water was run for five minutes. Then two samples were collected for both TPH and VOCs. The sampling procedure then followed the same protocol described above.

Laboratory Results

The samples collected were analyzed for volatile organic compounds (VOCs) by method 8020 and total petroleum hydrocarbons (TPH) by method 8100. The results of these analyses showed that in all cases no compounds were present in concentrations above the detection limits of the analysis method.

A copy of the lab results from the samples taken are included as Appendix E. Please note that the analysis results indicated as "MW-1" are for a sample collected from monitoring well MW-2 as shown on the site plan, and are applicable for MW-2 as described in this report. The results indicated as "MW-2" are for a sample obtained from MW-3 as shown on the site plan and described as MW-3 in this report.

Interpretation of Results

The test methods employed and results from groundwater and tap water sampling activity are shown below in Table 4. Since no contaminants were detected in either of the wells, nor in the tap water sample, there is no data to interpret.

TABLE 4
RESULTS OF WATER QUALITY SAMPLING AND ANALYSIS

Monitoring Well	Location	Depth to Groundwater	Test methods	Results
MW-1	NW of Base Lodge - Upgradient	27' 6"	None - dry	NA
MW-2	SW of Base Lodge - Downgradient	17' 3"	TPH (8100) VOCs (8020)	Below detection limits
MW-3	SE of base Lodge - Downgradient	13' 2"	TPH (8100) VOCs (8020)	Below detection limits
TAP	Ladies Rest Room in Base Lodge	NA	TPH (8100) VOCs (8020)	Below detection limits

Conclusions

DSM sited and oversaw the installation of groundwater monitoring wells at locations on the Bromley Site that may intercept contaminants migrating as a result of a release at the former UST site. DSM then followed established protocol to sample and test soil and groundwater for an indication of subsurface contamination as a result of a suspected release from the closed underground storage tanks on the property.

The results of groundwater sampling and analysis indicate that VOC's and TPH are below detection limits. In addition, the results of analysis on a potable water sample indicates VOCs and TPH are below detection limits.

DSM believes there is no need for further investigation or groundwater sampling as a result of the site conditions observed, and the water quality analysis results.

Appendices

- A** List of Adjacent Landowners
- B** Locus, Site, and Groundwater Maps
- C** Boring Logs
- D** Soils Information
- E** Lab Results

Appendix A

List of Adjacent Landowners

Schedule E
Bromley Ski Resort
List of Adjoining Property Owners

Bromley Sun Lodge
E.J.D. Inc.
Peru, Vt 05152
802-824-6941

Robert & Lois Williamson
42-37 203 St.
Bayside, NY 11361
802-824-4551

John & Susan Knox
1886 Delphi Rd.
New Woodstock, NY 13122

Arthur Weinsbank
P.O. Box 1556
New Milford, Ct 06776
802-824-6024

Arthur Chace
Cherry Lane
Fairfield, Ct 06430
802-775-2446

Gary Warner
14 Cove Rd.
Brookfield, Ct 06804

Charles Noyes
RD1 Box 183
Chatham, NY 12037
802-824-3221

Mr. Nick Cameron
6 Noe Ave
Madison, NJ 07940
201-822-2546

Endre P. Thoma
40 Birchwood Dr.
Colchester, Vt 05446
802-878-5212

Louis & Elizabeth de Schweinitz
P.O. Box 57
Peru, Vt 05152
802-824-3434

Elizabeth H. Hulett
Route 11
Peru, Vt 05152
802-824-3037

Eric & Peter Broderson
P.O. Box 171
Manchester Center, Vt
05255
802-362-4686

Marie Strother
622 Ehrhardt Ave
Beverly, NJ 08101

U.S. Forest Service
Ms. Beth LeClair
RR2 Box 35
Rochester, Vt 05767
802-293-5022

J.P.W. Associates
RR2 Box 2996
Manchester Center, Vt
05255
802-362-3892

Alan Parrish
120 Pulpit Hill Rd. #28
Amherst, Ma 01002
802-824-7464
413-219-1807

The Inn Thing, Inc.
Johnny Seesaws
Peru, Vt 05152
802-824-5533

Marion & Robert H. Brien
150 Canterbury Rd.
Fairless Hills, Pa 19030
802-824-6657

Chad & Ann Bessette
Rt.11 RR1 Box 150
Peru, Vt 05152
802-824-3885

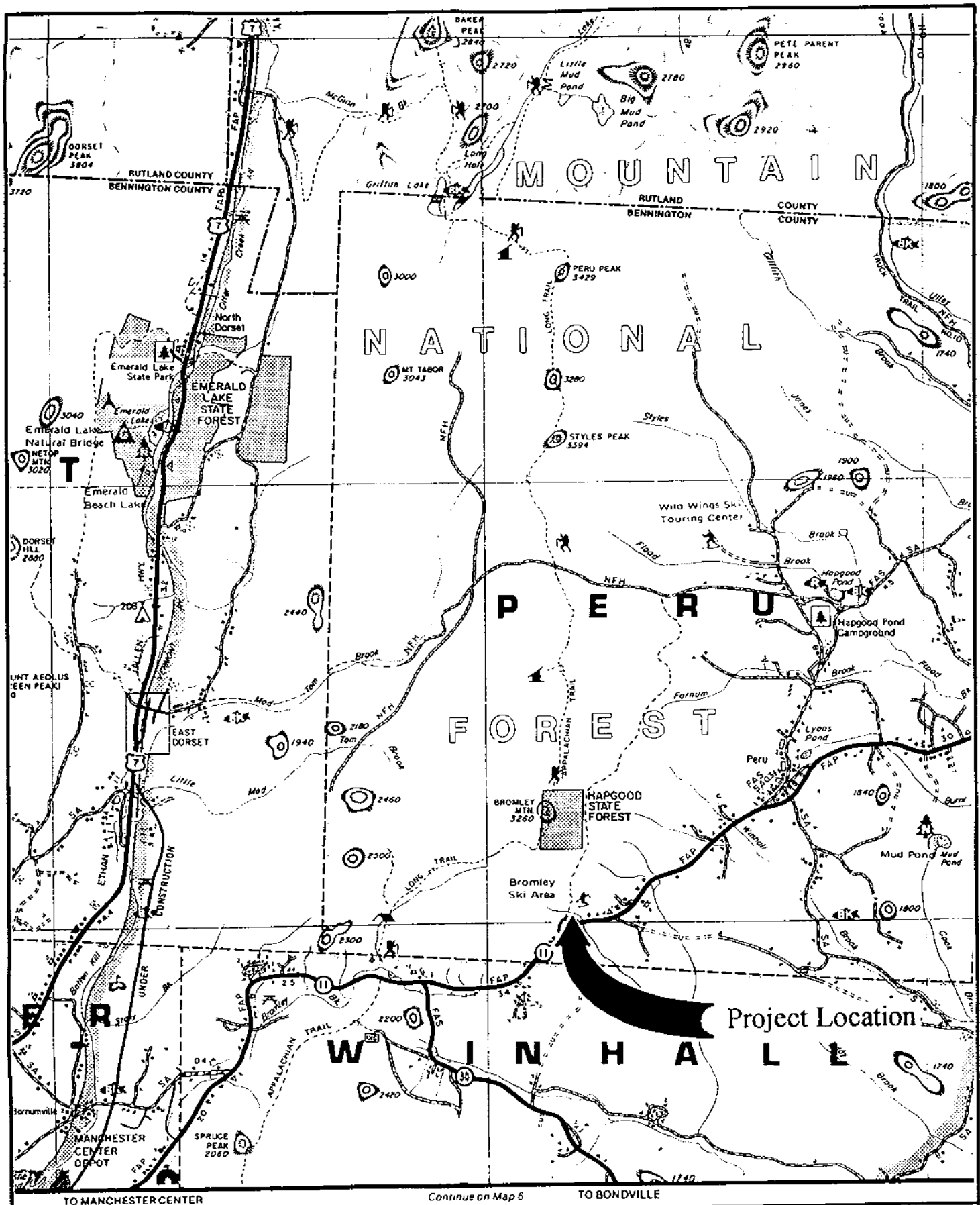
Howard & Helen Marsh
15 Orchard Hill Rd.RD
Greenwich, Ct 06831
802-824-3714
203-861-0975

Minturn V. Chase
2 Bayberry Ln.
Mt. Kisco, NY 10549

Mr. Ed Leary
State Forest and Leased Land Administrator
Agency of Natural Resources
103 South Main St.
Waterbury, Vt 05676
802-726-5400

Appendix B

Locus, Site, and Groundwater Maps



TO MANCHESTER CENTER

Continue on Map 6

TO BONDVILLE

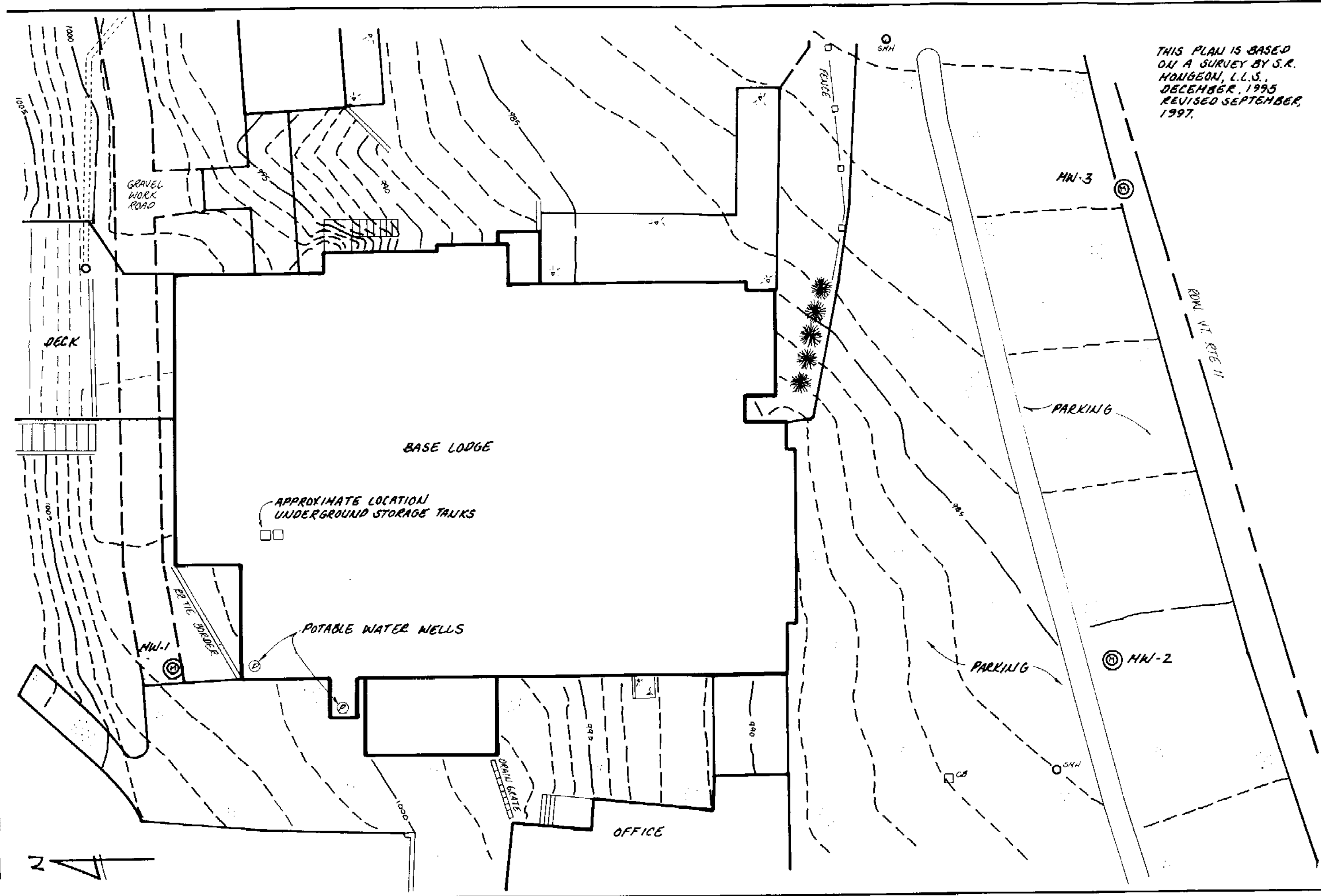
DSM Environmental Services, Inc.

Drawn By: Ted Reeves

Date: October, 1997

Scale: As Shown

Locus Plan
Bromley Mountain Site Investigation



THIS PLAN IS BASED
ON A SURVEY BY S.R.
HOMERON, L.L.S.,
DECEMBER, 1995
REVISED SEPTEMBER,
1997.

PARTIAL SITE PLAN		DSM ENVIRONMENTAL SERVICES, INC.
BROMLEY MOUNTAIN SITE INVESTIGATION		DRAWN BY: Details - a technical service
PERU, VERMONT		SCALE: 1" = 20'
		DATE: October, 1997

Appendix C

Boring Logs

GREEN MOUNTAIN BORING

PO Box 218 ° East Barre, Vermont 05649 ° 802 476-5073

TO: DSM Environmental Services, Inc.
Thrasher Road and Route 5
P.O. Box 466
Ascutney, VT 05030
Attn.: Ted Reeves

PROJECT NAME: Mt. Bromley

LOCATION: Peru, VT

GMB JOB #: 97-102

SHEET: 1
DATE: 9/4/97
HOLE #: MW-1
LINE & STA.
OFFSET:

Ground Water Observations				Surface Elev.:	
At 0 at .5 hours	Type	Augers	Split Spoon	Date Started:	9/4/97
	Size I.D.	4.25"	13/8"	Date Completed:	9/4/97
At at hours	Hammer Wt.		140#	Boring Foreman:	Ron Garneau
	Hammer Fall		30"	Inspector:	
				Soils Eng.:	

LOCATION OF BORING: As marked

Depth	Casing Blows Per Foot	Sample Depths From/To	Type of Sample	Blows per 6" on Sampler	Moisture Density or Consist.	Strata Change Elev.	Soil Identification	Sample		
								No. Rec.	Pen	
		5'-7'	SS	7/18/24/27	dry		Brown very fine sand with a little silt and small stones	1	24"	18"
		10'-12'	SS	100/82/42/50	dry		Brown very fine sand with a little silt and small stones	2	24"	6"
		15'-17'	SS	52/48/45/71	dry		Brown very fine sand with a little silt and small stones	3	24"	18"
							Drilled to 27'			
							Auger refusal on rock			
							Installed well			
							Materials used:			
							10' .020 screen			
							15' 2" PVC riser			
							3 bags of #1 sand			
							.5 bag of benseal			
							1 set of top wing locking cap and bottom cone caps			
							1 road box			
							1 bag of cement			

Ground Surface to 27' Used 4.35" Augers: Then installed well

SUMMARY: Earth Boring 27' Rock Coring Samples 3 HOLE # MW-1

GREEN MOUNTAIN BORING

PO Box 218 ° East Barre, Vermont 05649 ° 802 476-5073

TO: DSM Environmental Services, Inc.
Thrasher Road and Route 5
P.O. Box 466
Ascutney, VT 05030
Attn.: Ted Reeves

PROJECT NAME: Mt. Bromley

LOCATION: Peru, VT

GMB JOB #: 97-102

SHEET: 3
DATE: 9/5/97
HOLE #: MW-2
LINE & STA.
OFFSET:

Ground Water Observations	Type	Augers	Split Spoon	Surface Elev.:
At 0 at .5 hours	Size I.D.	4.25"	13/8"	Date Started: 9/5/97
At at hours	Hammer Wt.		140#	Date Completed: 9/5/97
	Hammer Fall		30"	Boring Foreman: Ron Garneau
				Inspector:
				Soils Eng.:

LOCATION OF BORING: in middle of parking lot next to island

Depth	Casing Blows Per Foot	Sample Depths From/To	Type of Sample	Blows per 6" on Sampler	Moisture Density or Consist.	Strata Change Elev.	Soil Identification	Sample		
								No. Rec.	Pen	
		5'-7'	SS	17/20/43/22	dry		Medium and fine sand with small pebbles and stones	1	24"	8"
		10'-12'	SS	25/73/53/100 for 5"	dry		Medium and fine sand with small pebbles and stones	2	24"	15"
		15'-17'	SS	100 for 3"	dry		No recovery	3	24"	0"
							Drilled to 25'			
							Installed well			
							Materials used:			
							10' .020 screen			
							15' 2" PVC riser			
							3 bags of #1 sand			
							1 bag of benseal			
							1 set of top wing locking cap and bottom cone caps			
							1 road box			
							1 bag of cement			

Ground Surface to 25' Used 4.35" Augers: Then installed well

SUMMARY: Earth Boring 25' Rock Coring Samples 2 HOLE # MW-2

GREEN MOUNTAIN BORING

PO Box 218 ° East Barre, Vermont 05649 ° 802 476-5073

TO: DSM Environmental Services, Inc.
Thrasher Road and Route 5
P.O. Box 466
Ascutney, VT 05030
Attn.: Ted Reeves

PROJECT NAME: Mt. Bromley

LOCATION: Peru, VT

GMB JOB #: 97-102

SHEET: 2
DATE: 9/4/97
HOLE #: MW-3
LINE & STA.
OFFSET:

Ground Water Observations	Type Size I.D.	Augers 4.25"	Split Spoon 13/8"	Surface Elev.:
At 0 at .5 hours	Hammer Wt.		140#	Date Started: 9/4/97
At at hours	Hammer Fall		30"	Date Completed: 9/5/97
				Boring Foreman: Ron Garneau
				Inspector:
				Soils Eng.:

LOCATION OF BORING: in parking lot

Depth	Casing Blows Per Foot	Sample Depths From/To	Type of Sampl e	Blows per 6" on Sampler	Moisture Density or Consist.	Strata Change Elev.	Soil Identification	Sample		
								No. Rec.	Pen	
		5'-7'	SS	10/8/3/2	dry	6'	Hard packed brown sand and gravel into a dark brown mossey organic material with a trace of clay	1	24"	16"
		10'-12'	SS	20/23/33/30	damp/dry	10.5'	Brown fine sand and some small stones and pebbles with some little silt	2	24"	20"
		15'-17'	SS	15/30/50/38	dry		Fractured rock and fine and medium sand	3	24"	15"
							Drilled to 20'			
							Installed well			
							Materials used:			
							10' .020 screen			
							9' 2" PVC riser			
							3 bags of #1 sand			
							1 bag of benseal			
							1 set of top wing locking cap and bottom cone caps			
							1 road box			
							1 bag of cement			

Ground Surface to 20' Used 4.35" Augers: Then installed well

SUMMARY: Earth Boring 20' Rock Coring Samples 3 HOLE # MW-3

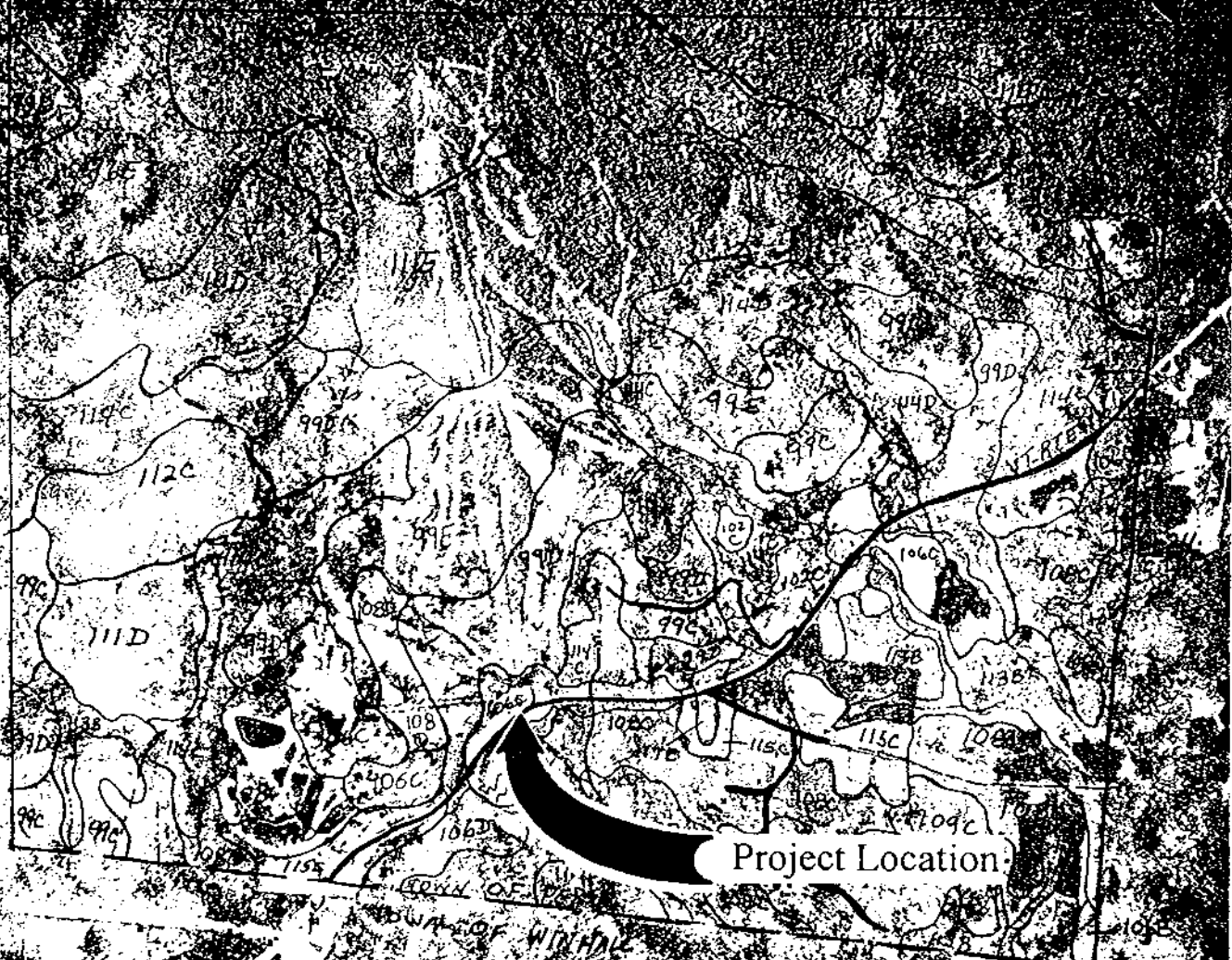
Appendix D
Soils Information

2 MAY 74

152.92

VI 7420

6-057



DEPARTMENT OF AGRICULTURE
AND CONSERVATION SERVICE
— COOPERATING WITH —
NATIONAL AGRICULTURAL EXPERIMENT STATION

APPROX. SCALE

1" = 1667'



USDA SCS FORT WORTH TEXAS

SOIL SURVEY FIELD SHEET
BENNINGTON COUNTY, VERMONT
ADVANCE COPY SUBJECT TO CHANGE

SURVEY HAS NOT BEEN RECHECKED SINCE 1967. RECHECKED 1974. MAP MAY BE OUT OF DATE. ALL SURVEYS MAY BE OUT OF DATE.

MA0030

SOIL INTERPRETATIONS RECORD

BERKSHIRE SERIES
STONY

PLAID: 143, 144, 144B
ST: 865-44L, 8-43
TYPIC MAPLEWOODS, COARSE-LOAMY, MIXED, FAIRLY

BERKSHIRE SERIES CONSISTS OF DEEP, WELL-DRAINED SOILS ON UPLANDS. THEY FORMED IN GLACIAL TILL. TYPICALLY, THESE SOILS HAVE A DARK BROWN, VERY STONY OR EXTREMELY STONY, FINE SANDY LOAM SURFACE, 4 INCHES THICK, OVER 2 INCHES OF LIGHT GRAY FINE SANDY LOAM. THE SUBSOIL LAYERS, FROM 8 TO 22 INCHES, ARE DARK REDDISH-BROWN, YELLOWISH-RED, AND YELLOWISH-BROWN FINE SANDY LOAM. THE SUBSTRATUM, FROM 22 TO 60 INCHES, IS LIGHT OLIVE BROWN FINE SANDY LOAM. SLOPES RANGE FROM 2 TO 45 PERCENT.

ESTIMATED SOIL PROPERTIES (A)											
DEPTH (IN.)	USDA TEXTURE	UNIFIED	ASHTO	FRAC. > 3 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 2" PASSING SIEVE NO.					LIQUID LIMIT	PLASTICITY INDEX
0-8	STV-FSL, STV-CL, STV-L	SM, ML	A-2, A-4, A-6	15-25	80-85	70-80	45-48	25-45		450	NP-10
8-22	STV-FSL, STV-CL, STV-L	SM, ML	A-2, A-4, A-6	30-45	80-95	70-80	45-48	25-45		450	NP-10
22-60	FSL, CL, SM-L	SM, ML	A-2, A-4, A-6	0-15	75-85	65-85	40-75	20-40		450	NP-10
				0-15	75-80	65-85	40-60	20-35		420	NP-6
DEPTH (IN.)	CLAY (PCT)	MOIST. BULK DENSITY (G/CM ³)	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHRS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTORS	WIND EROD. GROUP	ORGANIC MATTER (PCT)	CORROSION
0-8	3-10	1.10-1.15	0.6-6.0	0.05-0.22	3.4-6.0	-	LOW	20	3	2-5	STEEL CONCRETE
8-22	3-10	1.10-1.15	0.6-6.0	0.05-0.22	3.4-6.0	-	LOW	20	3	2-5	LOW HIGH
22-60	1-10	1.20-1.40	0.6-6.0	0.10-0.15	3.4-6.0	-	LOW	37	24		
FLOODING											
FREQUENCY				HIGH WATER TABLE				FLOODING			
DURATION				DEPTH (FT)				DEPTH (IN)			
MONTHS				RISK				HARDNESS			
NONE				25 0				25 0			

SANITARY FACILITIES (A)				CONSTRUCTION MATERIAL (B)			
SEPTIC TANK ABSORPTION FIELDS	3-25: SLIGHT	ROADFILL	3-15: FAIR-LOW STRENGTH	SAND	IMPROBABLE-EXCESS FINES	GRAVEL	IMPROBABLE-EXCESS FINES
	8-15%: MODERATE-SLOPE		15-25%: FAIR-LOW STRENGTH, SLOPE				
SEWAGE LAGOON AREAS	3-25: SEVERE-SEEPAGE	CRACKS	3-15: POOR-LARGE STONES	TOPSOIL	15-25%: POOR-LARGE STONES, SLOPE	WATER MANAGEMENT (C)	SEVERE-PIPING
	7-1%: SEVERE-SLOPE, SEEPAGE		15-25%: POOR-LARGE STONES, SLOPE				
SANITARY LANDFILL (TRENCH)	3-25: SEVERE-SEEPAGE	POND RESERVOIR AREA	0-25: SEVERE-SEEPAGE	IRRIGATION	SLOPE	TERRACES AND DIVERSIONS	3-25: LARGE STONES
	30-1%: SEVERE-SLOPE, SEEPAGE		5-1%: SEVERE-SLOPE, SEEPAGE				
SANITARY LANDFILL (AREA)	3-25: SEVERE-SEEPAGE	GRASSED WATERWAYS	3-25: LARGE STONES	GRADED WATERWAYS	3-25: LARGE STONES	GRADED WATERWAYS	3-25: LARGE STONES
	15-1%: SEVERE-SLOPE, SEEPAGE		15-25%: POOR-LARGE STONES, SLOPE				
DAILY COVER FOR LANDFILL	3-25: FAIR-SMALL STONES	SHALLOW EXCAVATIONS	0-25: SEVERE-SEEPAGE	DWELLINGS WITHOUT BASEMENTS	SEVERE-NO WATER	DWELLINGS WITH BASEMENTS	DEEP TO WATER
	0-15%: FAIR-SLOPE, SMALL STONES		5-1%: SEVERE-SLOPE, SEEPAGE				
BUILDING SITE DEVELOPMENT (D)	3-25: SLIGHT	SHALL COMMERCIAL BUILDINGS	3-25: MODERATE-SLOPE	LOCAL ROADS AND STREETS	TERRACES AND DIVERSIONS	TERRACES AND DIVERSIONS	3-25: LARGE STONES
	8-15%: MODERATE-SLOPE		15-25%: SEVERE-SLOPE				
DWELLINGS WITHOUT BASEMENTS	3-25: SLIGHT	DWELLINGS WITH BASEMENTS	8-15%: MODERATE-SLOPE	DWELLINGS WITH BASEMENTS	DWELLINGS WITH BASEMENTS	DWELLINGS WITH BASEMENTS	DWELLINGS WITH BASEMENTS
	8-15%: MODERATE-SLOPE		15-25%: SEVERE-SLOPE				
DWELLINGS WITH BASEMENTS	3-25: SLIGHT	DWELLINGS WITH BASEMENTS	8-15%: MODERATE-SLOPE	DWELLINGS WITH BASEMENTS	DWELLINGS WITH BASEMENTS	DWELLINGS WITH BASEMENTS	DWELLINGS WITH BASEMENTS
	8-15%: MODERATE-SLOPE		15-25%: SEVERE-SLOPE				
SHALL COMMERCIAL BUILDINGS	3-25: MODERATE-SLOPE	LOCAL ROADS AND STREETS	8-15%: MODERATE-SLOPE	LOCAL ROADS AND STREETS	LOCAL ROADS AND STREETS	LOCAL ROADS AND STREETS	LOCAL ROADS AND STREETS
	8-15%: MODERATE-SLOPE		15-25%: SEVERE-SLOPE				
LOCAL ROADS AND STREETS	3-25: MODERATE-SLOPE	LOCAL ROADS AND STREETS	8-15%: MODERATE-SLOPE	LOCAL ROADS AND STREETS	LOCAL ROADS AND STREETS	LOCAL ROADS AND STREETS	LOCAL ROADS AND STREETS
	8-15%: MODERATE-SLOPE		15-25%: SEVERE-SLOPE				
LAWNS, LANDSCAPING AND GOLF FAIRWAYS	3-25: MODERATE-SLOPE	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	8-15%: MODERATE-SLOPE	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	LAWNS, LANDSCAPING AND GOLF FAIRWAYS
	8-15%: MODERATE-SLOPE		15-25%: SEVERE-SLOPE				
LAWNS, LANDSCAPING AND GOLF FAIRWAYS	3-25: MODERATE-SLOPE	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	8-15%: MODERATE-SLOPE	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	LAWNS, LANDSCAPING AND GOLF FAIRWAYS	LAWNS, LANDSCAPING AND GOLF FAIRWAYS
	8-15%: MODERATE-SLOPE		15-25%: SEVERE-SLOPE				

REGIONAL INTERPRETATIONS

[illegible]

WOODLAND SUITABILITY (C)									
CLASS- DETERMINING PHASE	SND SYM	MANAGEMENT PROBLEMS				PLANT COMPET	POTENTIAL PRODUCTIVITY		
		EROSION HAZARD	EQUIP- LIMIT	SHEDDING HURTLY	WINDFN. HAZARD		COMMON TREES	SIZE INDEX	TREES TO PLANT
3-10% STV	36	SLIGHT	SLIGHT	SLIGHT	SLIGHT		EASTERN WHITE PINE	72	ASPEEN WHITE PINE
10-25% STV	38	SLIGHT	MODERATE	SLIGHT	SLIGHT		SUGAR MAPLE	52	CO. LME
26-51% STV	38	MODERATE	SEVERE	SLIGHT	SLIGHT		RED SPRUCE	40	WHITE SPRUCE
52-77% STV	38	SLIGHT	MODERATE	SLIGHT	SLIGHT		WHITE ASH	62	ALSAH FIR
78-100% STV	38	MODERATE	SEVERE	SLIGHT	SLIGHT		YELLOW BIRCH	64	
							PAPER BIRCH	40	
							BALSAM FIR	40	
							WHITE SPRUCE	66	
							RED PINE	64	

[illegible]

MIDDLE LIFE HABITAT SUSTAINABILITY (C)												
CLASS DETERMINING CLASS	POTENTIAL FOR HABITAT ELEMENTS					POTENTIAL AS HABITAT FOR						
	GRAIN 2 SEED	CLASS 2 LEAVES	WILD HERB	WARMED TERRACE	CONIFER PLANT	SHRUBS	WETLAND PLANTS	SHALLOW WATER	OPENED WILLOW	WOODED WILLOW	WETLAND WILLOW	WARMED TERRACE
3-4% STY	V. POOR	POOR	GOOD	GOOD	GOOD	-	-	-	POOR	POOR	POOR	-
4-5% STY	V. POOR	POOR	GOOD	GOOD	GOOD	-	-	-	POOR	POOR	POOR	-
3-4% STY	V. POOR	V. POOR	GOOD	GOOD	GOOD	-	-	-	POOR	POOR	POOR	-
4-5% STY	V. POOR	V. POOR	GOOD	GOOD	GOOD	-	-	-	POOR	POOR	POOR	-

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)					
COMMON PLANT NAME	PLANT SYMBOL (NRSYM)	PERCENTAGE COMPOST OR	DRY WEIGHT	BY CLASS	DETERMINING PHASE
POTENTIAL PRODUCTION (LBS./AC. DRY WT),					
FAVORABLE YEARS					
NORMAL YEARS					
UNFAVORABLE YEARS					

FOOTNOTES

- ESTIMATES BASED ON TEST DATA OF 3 PLOONS FROM FRANKLIN CO., MAINE, AND 3 PLOONS FROM SOMERSET CO., MAINE
RATINGS BASED ON NEW PART 14, SECTION 403, MARCH 1978
RATINGS BASED ON SOILS MEMOS 28, SEPT. 1967; OR 74, JAN. 1973
SITE INDEX IS A SUMMARY OF 6 OR MORE MEASUREMENTS ON THIS SOIL.

Appendix E

Lab Results

Please Note:

The laboratory analysis included in this Appendix indicates two samples collected from groundwater monitoring wells. The two samples collected are noted here as "MW-1" and MW-2." The sample noted as "MW-1" was collected from monitoring well MW-2 as noted on the site plan and noted in the text of this report. The analysis results noted as "MW-2" in the laboratory report are for a sample collected from monitoring well MW-3 on the site plan and as noted in the report.



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 9993

Client: DSM Environmental Services

Client Designation: Bromely 318

Volatile Organic Compounds

Sample ID:	MW-1	MW-2	Lodge TAP
Matrix:	Aqueous	Aqueous	Aqueous
Date Received:	9/18/97	9/18/97	9/18/97
Units:	µg/L	µg/L	µg/L
Date of Analysis:	9/19/97	9/19/97	9/19/97
Analyst:	CWC	CWC	CWC
EPA Method:	8240	8240	8240

Chloromethane	< 2	< 2	< 2
Bromomethane	< 2	< 2	< 2
Vinyl chloride	< 2	< 2	< 2
Chloroethane	< 10	< 10	< 10
Methylene chloride	< 2	< 2	< 2
1,1-Dichloroethene	< 1	< 1	< 1
1,1-Dichloroethane	< 2	< 2	< 2
trans-1,2-Dichloroethene	< 2	< 2	< 2
cis-1,2-Dichloroethene	< 2	< 2	< 2
Chloroform	< 2	< 2	< 2
1,2-Dichloroethane	< 2	< 2	< 2
1,1,1-Trichloroethane	< 2	< 2	< 2
Carbon tetrachloride	< 2	< 2	< 2
Bromodichloromethane	< 2	< 2	< 2
trans-1,3-Dichloropropene	< 2	< 2	< 2
Trichloroethene	< 2	< 2	< 2
Dibromochloromethane	< 2	< 2	< 2
1,1,2-Trichloroethane	< 2	< 2	< 2
cis-1,3-Dichloropropene	< 2	< 2	< 2
2-Chloroethoxyethene	< 2	< 2	< 2
Bromoform	< 2	< 2	< 2
Tetrachloroethene	< 2	< 2	< 2
1,1,2,2-Tetrachloroethane	< 2	< 2	< 2

Acetone	< 50	< 50	< 50
2-Butanone(MEK)	< 10	< 10	< 10
Vinyl acetate	< 10	< 10	< 10
4-Methyl-2-pentanone(MIBK)	< 10	< 10	< 10
2-Hexanone	< 10	< 10	< 10
Methyl-t-butyl ether(MTBE)	< 20	< 20	< 20

Benzene	< 1	< 1	< 1
Toluene	< 1	< 1	< 1
Ethylbenzene	< 1	< 1	< 1
Total Xylenes	< 1	< 1	< 1
Chlorobenzene	< 2	< 2	< 2
Styrene	< 1	< 1	< 1

Approved By: Clifford Chase, Volatile Organics Supervisor



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 9993 DSM

Client: DSM Environmental Services

Client Designation: Bromely 318

Total Petroleum Hydrocarbons

Sample ID:	MW-1	MW-2	Lodge Tap
Matrix:	Aqueous	Aqueous	Aqueous
Date Received:	9/18/97	9/18/97	9/18/97
Units:	mg/L	mg/L	mg/L
Date of Extraction:	9/19/97	9/19/97	9/19/97
Date of Analysis:	9/19/97	9/19/97	9/19/97
Analyst:	DJS	DJS	DJS
EPA Method:	8100(mod)	8100(mod)	8100(mod)
Carbon Range:	C9-C40*	C9-C40*	C9-C40*
Total Petroleum Hydrocarbons	< 0.5	< 0.5	< 0.5

* Fuel (Diesel) and Lubricating Oil Range Organics.

Approved By: Timothy Schaper, Organics Supervisor